

Men's and Women's Patterns of Substance Use Around Pregnancy

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ABSTRACT: Background: Little is known about men's patterns of substance use around their partner's pregnancy, despite evidence from studies of pregnant women that men's substance use may reduce women's ability to desist from substance use during pregnancy, increase the probability that women will return to use postpartum, and increase the risk of adverse child outcomes. The purpose of this study was to describe the association between pregnancy or partner's pregnancy and month-by-month patterns of binge drinking, daily smoking, and marijuana use among young men and women. **Methods:** Data were drawn from the Seattle Social Development Project, which included 412 men and 396 women (age 24 yr) from a community sample of individuals who attended elementary school in the northwestern United States. Event history calendars were used to measure month-by-month patterns of binge drinking, daily smoking, marijuana use, and childbirth over a 3-year period from 1996 to 1999. **Results:** Births during the calendar period were reported by 131 women and 77 men. Hierarchical generalized linear modeling analyses showed that men's rates of binge drinking and marijuana use were unaffected by their partner's pregnancy. Pregnancy decreased the probability of substance use among women, but use returned to prepregnancy levels within 2 years postpartum. **Conclusions:** Men's substance use was not affected by their partner's pregnancy. Pregnancy decreased the probability of substance use among women, but substantial proportions of women users of cigarettes and marijuana used these substances during pregnancy. Many of the women who desisted from substance use while pregnant returned to use after their child was born. (BIRTH 35:1 March 2008)

Key words: substance use, pregnancy, fathers, mothers

Health concerns related to prenatal substance use have led to public policies and highly visible public health campaigns aimed at reducing alcohol and tobacco use during pregnancy among women (1,2). With the possible exception of cigarette smoking, however, little

attention is paid to substance use among men whose partner is pregnant. Furthermore, although parental substance use in the postnatal developmental environment is associated with a wide array of negative child outcomes (3–7), policy and public health strategies for

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reducing substance use among both fathers and mothers after pregnancy are limited (2). Health care practitioners who serve new or soon-to-be parents are well situated to fill these important gaps by screening parents, both fathers and mothers, for substance use, helping to educate them about the negative effects of both prenatal and postnatal parental substance use on child health, and connecting them with appropriate resources to reduce harmful substance use.

Fathers' persistence in substance use, especially cigarette smoking, during their partner's pregnancy decreases the probability that mothers will desist from substance use during pregnancy and increases the probability of postpartum relapse among women (8–12). In addition, paternal substance use during the prenatal period has been associated independently with adverse child outcomes, including reduced birthweight (cigarette smoking) (13,14), increased risk of childhood cancers (cigarette smoking) (15), and increased risk of sudden infant death syndrome (marijuana use) (16). An understanding of men's patterns of substance use around their partner's pregnancy is necessary to identify critical periods for intervention to reduce children's exposure to paternal substance use.

The few studies available on men's substance use during their partner's pregnancy suggest that men are unlikely to change their patterns of substance use with impending fatherhood (17–19). Existing studies, however, have either focused solely on cigarette smoking (14) or, if they examine the use of other drugs, have measured substance use over very broad time frames (e.g., any use after pregnancy recognition but before birth, any use after birth) (13,15). More detailed, national data on women's patterns of substance use around pregnancy are available and suggest that many women desist from substance use during pregnancy, but that most of those who desist return to use postpartum (18,20–24). This study aims to extend existing knowledge by describing and predicting patterns of binge drinking, daily tobacco smoking, and marijuana use around pregnancy and partner's pregnancy among men and women using the event history calendar method (25–30).

Methods

Study Sample

Data were drawn from the Seattle Social Development Project, a longitudinal study of prosocial and antisocial behavior. Participants were recruited during a period of mandatory school busing to promote desegregation from 18 public elementary schools in Seattle, Washington, United States, that served both

high-crime and middle-class neighborhoods. From the population of 1,053 students entering grade 5 (age 10 yr) in participating schools in the autumn of 1985, 808 students (76.7% of the population) consented to participate in the longitudinal study and constitute the project sample. Interviews were conducted yearly from ages 10 to 16, at age 18, and again at ages 21 and 24 years. The data used in this study were obtained from surveys administered in 1999 (age 24 yr).

Interviews were conducted in person and were administered by trained interviewers in the participant's home or in another private location. Informed consent was gathered in person before the start of the interview. Interview questions and informed consent procedures were approved by the University of Washington Institutional Review Board.

The project sample included about equal numbers of males ($n = 412$) and females ($n = 396$). These participants were not dating pairs. At the age of the 24-year interview, many participants were partnered with people who were not in this study. The sample was ethnically diverse—approximately 47 percent of participants were Caucasian, 26 percent African American, 22 percent Asian American, and 5 percent Native American. Of these groups, 5 percent were Hispanic. Approximately 52 percent of the sample experienced childhood poverty, as evidenced by participation in the National School Lunch/School Breakfast Program when participants were between the ages of 10 and 12 years.

Participant retention at age 24 years was 93 percent ($n = 752$). Nonparticipation at each assessment wave was not consistently related to ethnicity or alcohol, tobacco, marijuana, or other illicit drug use by age 10 years. Three women who reported adopting a child during the calendar period were excluded from all analyses.

Measures and Procedure

Event history calendars were administered at age 24 years and were retrospective to 21 years. To provide temporal context, a series of questions about life events, including changes in marital status, death of a friend or family member, housing and mobility, and work and school history were asked. Participants then were asked whether they had experienced the birth of a child. Elsewhere on the calendar, participants reported whether they had consumed 5 or more drinks in a 2-hour period (called "binge drinking" in this paper), smoked 1 or more cigarettes per day, or used marijuana in the 3 years before the interview. Reports of events were probed to identify the month and year

in which they occurred, and repeated events were probed to identify the month and year of each occurrence. Pregnancy was deduced based on the birth date of the child. Demographic data were self-reported by participants.

The calendar method addresses several methodological limitations in previous research. It is a longitudinal method and so can capture within-person patterns of use, desistance, and relapse over time. It can provide detailed information about the timing of substance use. In addition, the calendar method may be particularly useful in the study of substance use during pregnancy and immediately postpartum because respondents are asked separately about the timing of pregnancy, childbirth, and substance use during the recall period. Thus, the method greatly reduces the pressure for socially desirable responding. Published data suggest that calendars are successful in detecting prenatal substance use among women (31). In a recent study comparing the sensitivity of calendars and various biologic specimens, including meconium, newborn urine, and maternal hair samples, the calendar-based interview was "the single method that maximally identified users" (32, p. 677).

Data Analysis

Given the multilevel structure of the data (repeated observations nested within person), data were analyzed using hierarchical generalized linear modeling (HGLM) and HLM version 6 software (Scientific Software International, Lincolnwood, Illinois) (33). HGLM is an extension of hierarchical linear modeling that is appropriate to outcome variables that are not normally distributed. In the present study, outcome variables were dichotomous (e.g., did or did not use marijuana in a given month). For each outcome, we specified a Bernoulli model with a logit link function to estimate the probability of the outcome as a function of predictors. HGLM is a powerful method for examining change within a person over time, but also allows between-person comparisons (33). Both of these capabilities were used in this study.

A portion of the study sample was exposed to a multicomponent preventive intervention in the elementary grades, consisting of teacher training, parenting classes, and social competence training for children (34). Special care must be taken when conducting studies of etiology on samples that contain interventions. Although differences in prevalences and means have been observed between intervention and control groups in this sample, prior analyses have shown few differences in the covariance structures of the groups (35,36). Similarly, analyses for this study found no

evidence that the relationship between pregnancy and the probability of binge drinking, daily cigarette use, or marijuana use differed by treatment group. Treatment-group-by-pregnancy interaction terms were nonsignificant in HGLM analyses. Therefore, the full sample was used in all analyses.

Results

Descriptive Findings

During the period covered by the event calendar, 131 women reported a total of 157 births (range 1–3) and 77 men reported a total of 87 births (range 1–3). Approximately 71 percent ($n = 93$) of women who reported a birth lived with a spouse or partner during their pregnancy. Approximately 68 percent ($n = 52$) of men who reported a birth lived with their spouse or partner while she was pregnant.

Table 1 shows the prevalence of substance use between ages 21 and 24 years among various groups in the sample by gender. For each substance examined, the overall prevalence of use in the entire sample is presented. In addition, the rates of use during pregnancy or partner's pregnancy, the rates of any use during pregnancy or partner's pregnancy among those who ever used each substance during the calendar period, and the rates of use throughout pregnancy among those who ever used each substance during the calendar period are presented.

To allow visual examination of the relationship between pregnancy or partner's pregnancy and monthly patterns of substance use, the month-by-month prevalence of binge drinking, daily cigarette use, and marijuana use were graphed. The prevalence of use of these substances among those who did not have a child is provided for comparison (Figs. 1a, 2a, and 3a, respectively). Because these graphs describe raw data, small, month-by-month variations in frequency may not be meaningful. Larger, systematic variations, however, can be illustrative and informative. For those who did not have a child, monthly data are graphed in chronological order along the x axis from age 21 to 24 years. For those who did have a child, monthly data are centered on the month of birth for the first pregnancy during the time period.

This method allowed examination of aggregate patterns of substance use during pregnancy across participants. Because of this centering, however, data at the extreme ends of the graph are based on fewer participants and should be interpreted cautiously. Overall, rates of binge drinking and marijuana use before pregnancy were comparable to those of participants who did not have a child. In this sample,

Table 1. Prevalence of Substance Use among Men and Women in the Sample from Age 21 to 24 Years

<i>Drug and Subsample</i>	<i>Men No. (%)</i>	<i>Women No. (%)</i>
Binge drinking		
Among all participants	202 (54)	89 (24)
Among those who became pregnant*	42 (55)	24 (18)
Among binge-drinking parents: any use during pregnancy	28 (67)	8 (33)
Among binge-drinking parents: use throughout pregnancy	24 (57)	2 (8)
Daily cigarette smoking		
Among all participants	163 (43)	121 (32)
Among those who became pregnant	40 (52)	52 (40)
Among smoking parents: any use during pregnancy	31 (78)	38 (73)
Among smoking parents: use throughout pregnancy	29 (73)	20 (38)
Marijuana use		
Among all participants	185 (49)	110 (29)
Among those who became pregnant	39 (51)	38 (29)
Among marijuana-using parents: any use during pregnancy	25 (64)	18 (47)
Among marijuana-using parents: use throughout pregnancy	21 (54)	9 (24)

*For men, "pregnancy" refers to having a pregnant partner.

Table 2. Hierarchical Linear Models Predicting Monthly Binge Drinking, Daily Cigarette Use, and Marijuana Use: Ages 21 to 24 Years

<i>Predictor</i>	<i>Binge Drinking</i>			<i>Daily Cigarette Use</i>			<i>Marijuana Use</i>		
	<i>Coefficient</i>	<i>SE</i>	<i>p</i>	<i>Coefficient</i>	<i>SE</i>	<i>p</i>	<i>Coefficient</i>	<i>SE</i>	<i>p</i>
Constant	-5.09	0.13	< 0.01	-3.20	0.31	< 0.01	-4.04	0.25	< 0.01
Between-person effect of gender (male)	3.40	0.15	< 0.01	1.32	0.42	< 0.01	1.83	0.34	< 0.01
Within-person linear effect of time	-0.07	0.03	< 0.01	0.11	0.08	0.20	-0.20	0.03	< 0.01
Within-person quadratic effect of time	—	—	—	0.10	0.04	< 0.01	-0.09	0.02	< 0.01
Within-person effect of pregnancy	-2.41	0.50	< 0.01	-2.63	0.23	< 0.01	-1.76	0.24	< 0.01
Gender × pregnancy interaction	2.76	0.60	< 0.01	1.15	0.46	0.01	2.55	0.31	< 0.01

Note: Results are from the unit-specific models.

however, rates of daily smoking were higher among both men and women who became parents between ages 21 and 24 years than among those who did not.

Figure 1b shows the month-by-month prevalence of binge drinking by gender among those participants who had a child. Binge drinking among fathers appeared to be unaffected by their partner's pregnancy, remaining relatively stable at approximately 35 percent before, during, and after their partner's pregnancy. The prevalence of binge drinking among women declined from approximately 6 percent pre-pregnancy to approximately 2 percent over the first trimester of pregnancy (6–8 mo before the month in which birth occurred). Rates of binge drinking among pregnant women remained low until about 3 months after the birth of the child when they began slowly to increase. Binge drinking among mothers returned to prepregnancy levels 18 to 20 months after birth.

The prevalence of daily cigarette use among men declined gradually from approximately 42 percent to approximately 37 percent from over a year before the

birth of the child to the end of their partner's pregnancy (Fig. 2b). Men's daily smoking showed a sharp rebound after the birth of their child, returning to prepregnancy rates in about 10 months. Among pregnant women, the prevalence of daily smoking decreased from more than 30 percent to approximately 20 percent after the first month of pregnancy or 7 months before the birth month. Daily smoking among women continued to decline gradually throughout pregnancy, but rebounded sharply almost immediately after birth. Rates nearly doubled in the first 4 months postpartum (from approximately 16% to approximately 30%) and reached prepregnancy levels by 1 year postpartum.

Figure 3b shows that rates of marijuana use among fathers did not appear to be affected by having a pregnant partner; in each month, approximately 25 to 30 percent of men who had a child used marijuana. Rates declined during the first trimester among women who reported a birth, from just over 10 percent to approximately 7 percent. Between 7 and 10 percent of mothers continued

to use marijuana from 6 months before birth until their child was born. After the baby's birth, the prevalence among women increased steadily but gradually, returning to prebirth rates at about 2 years after birth.

Hierarchical Generalized Linear Models

Table 2 shows the technical results of HGLM analyses predicting monthly binge drinking, cigarette use, and marijuana use; women constitute the reference group. For ease of interpretation, results are trans-

lated into odds ratios in the text. Odds ratios for women are based on the model presented in Table 2. Odds ratios for men are based on an otherwise identical model in which the coding of the gender variable was reversed (not shown). No relationship was found between partner's pregnancy and binge drinking among men. In other words, men were as likely to binge drink during their partner's pregnancy as they were when their partner was not pregnant (i.e., before or after their partner's pregnancy, OR 0.82, 95% CI 0.44–1.52). In contrast, women were significantly less likely to binge drink during pregnancy compared with

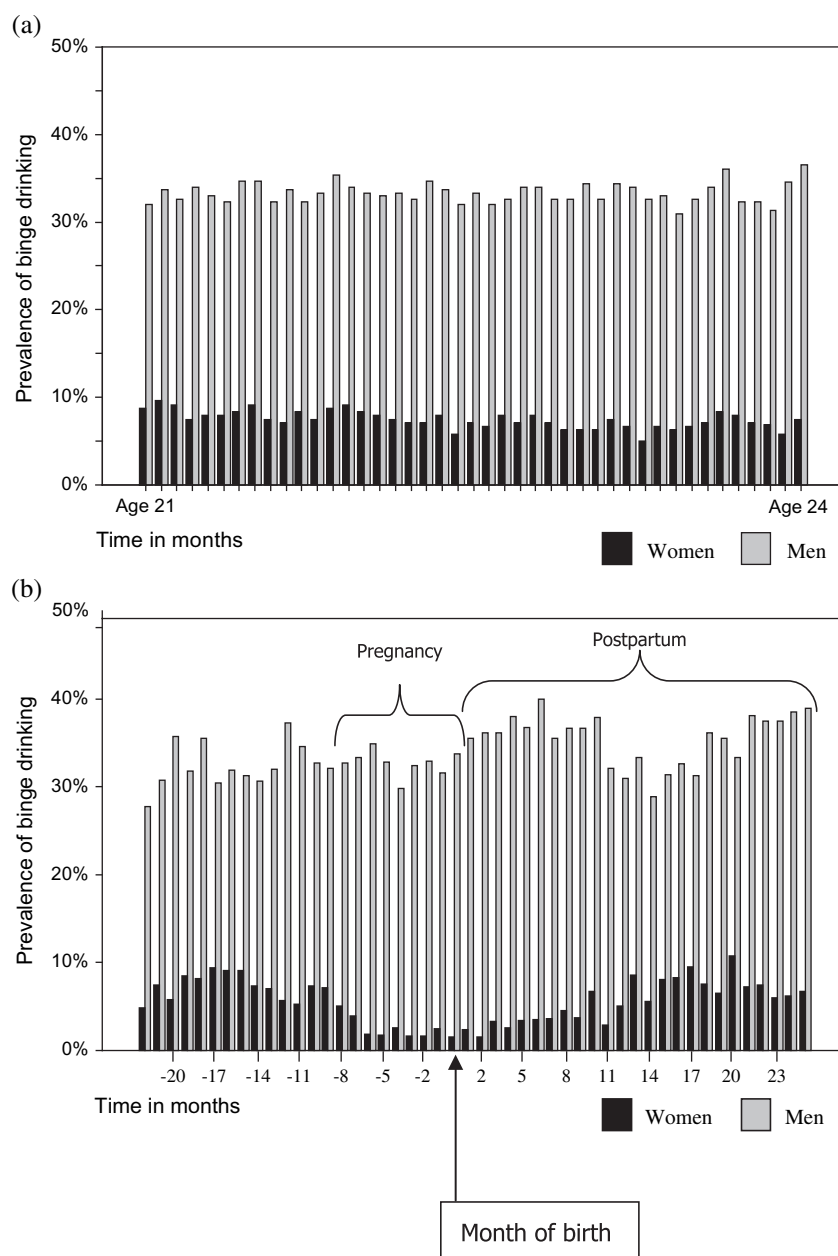


Fig. 1. Monthly prevalence of binge drinking from age 21 to 24 years among men and women who (a) did not have a child or (b) did have a child based on retrospective interviews at age 24 years.

before or after pregnancy (OR 0.09, 95% CI 0.04–0.20). Between-person analyses indicated that the relationship between pregnancy and binge drinking was significantly different for men and women, as evidenced by a statistically significant gender \times pregnancy interaction term.

A negative association was found between partner's pregnancy and the probability of daily cigarette use for men. Men were less likely to smoke when their partner was pregnant than they were when their partner was not pregnant (OR 0.23, 95% CI 0.10–0.50). A significant negative relationship was also found between pregnancy and the probability of daily cigarette use among women; women were less likely to

smoke during pregnancy than they were before or after pregnancy (OR 0.07, 95% CI 0.05–0.11). A significant gender \times pregnancy interaction term in between-person analyses showed that the effects of pregnancy on the probability of daily smoking were stronger for women than for men.

We found no negative relationship between partner's pregnancy and the probability of marijuana use for men, suggesting that men were as likely to use marijuana during their partner's pregnancy as they were when their partner was not pregnant (OR 1.57, 95% CI 0.96–2.55). Results showed a significant, negative association between pregnancy and the probability of marijuana use among women, suggesting that

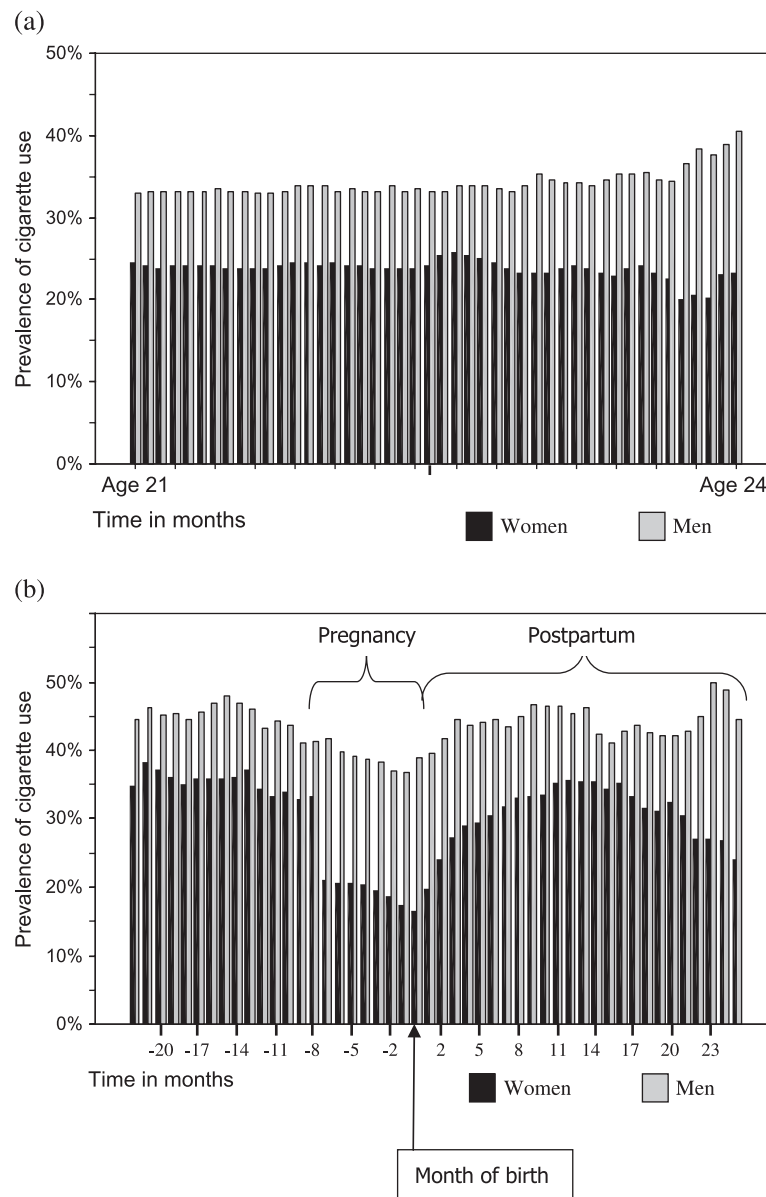


Fig. 2. Monthly prevalence of daily cigarette use from age 21 to 24 years among men and women who (a) did not have a child or (b) did have a child based on retrospective interviews at age 24 years.

women were less likely to use marijuana when they were pregnant than when they were not pregnant (OR 0.17, 95% CI 0.11–0.28). The relationship between pregnancy and marijuana use was significantly different for men and women in between-person analyses, as evidenced by the statistically significant gender \times pregnancy interaction term.

Discussion

This study examined the relationship between pregnancy or partner's pregnancy and patterns of binge

drinking, cigarette use, and marijuana use, desistance, and return to use over a 3-year period from age 21 to 24 years. The present study, using the event calendar method, yielded prevalence rates of substance use during pregnancy that were comparable with, although slightly higher than, rates found in nationally representative surveys, supporting the reliability of estimates obtained using this method (23). Given that the current sample was recruited from schools serving high-crime neighborhoods in addition to middle-class neighborhoods, it is not surprising to find rates of substance use during pregnancy that are higher than those found in national studies. Caution must be used,

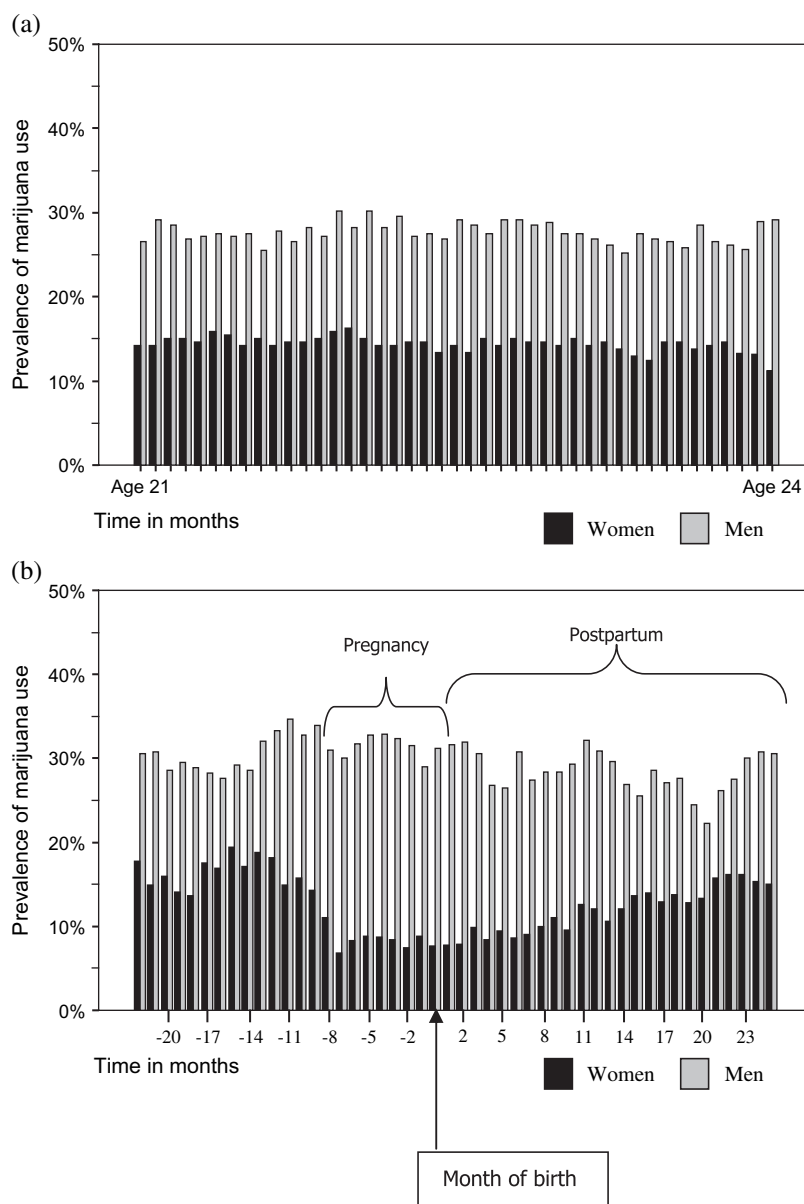


Fig. 3. Monthly prevalence of marijuana use from age 21 to 24 years among men and women who (a) did not have a child or (b) did have a child based on retrospective interviews at age 24 years.

however, in generalizing results from this study. Samples drawn from different age cohorts, socioeconomic strata, or time periods may yield differing results.

Men's binge drinking and marijuana use were not reduced by their partner's pregnancy or by the advent of fatherhood. Although statistically significant, observed declines in men's cigarette smoking during the calendar period (Fig. 2b) were small and began about 6 months before their partner's pregnancy. The observed pattern of cigarette smoking among men in these data is more consistent with the "marriage effect" identified among men in the Monitoring the Future study (19) than with an effect of partner's pregnancy. Figure 2b also suggests that men's daily smoking may increase after the birth of a child.

Among women, pregnancy significantly decreased the probability of use of each of these substances but desistence often occurred a few months into the pregnancy. Furthermore, cigarette and marijuana use were not reduced to the same extent as binge drinking. Nearly one-quarter of women marijuana users in this sample used marijuana during their entire pregnancy.

Women rapidly returned to substance use after the birth of their child. The finding that rates of binge drinking, daily cigarette use, and marijuana use among mothers returned to prepregnancy levels within about 2 years is consistent with existing research (18,21,22,24,37). Return to binge drinking and marijuana use occurred gradually, in a somewhat linear fashion. Return to daily cigarette use occurred more quickly (by 1 yr postpartum) than did the return to other substance use, with especially rapid increases in daily smoking rates in the first 3 to 4 months postpartum.

Implications for Preventive Intervention

The lack of change in men's binge drinking and marijuana use and the lack of permanent change in women's patterns of substance use during and after pregnancy are troubling and highlight a need for preventive intervention. Many women already have accomplished the difficult task of cessation during pregnancy. Because the birth of a child is a period of potentially stressful change in roles and responsibilities (18), and because a return to cigarette smoking among men and to all three forms of substance use among women occurs so soon after birth, the first few months postpartum may provide a critical opportunity for intervention.

The present data indicate that men's binge drinking and marijuana use were unaffected by their partner's pregnancy or by the birth of their child. These data

suggest the importance of reaching new fathers and fathers-to-be with messages about the importance of stopping substance use during their partner's pregnancy. Reductions in substance use among young fathers, both during their partner's pregnancy and after the birth of their child, would likely increase the probability that mothers will desist from substance use during pregnancy, decrease the probability that mothers will relapse to use postpartum, and reduce children's exposure to harmful substance use in the home environment (8–16). With the possible exception of cigarette smoking, however, reducing substance use among fathers is not a focus of current public health efforts (2). Practitioners who work with new and soon-to-be parents are well positioned to intervene to reduce the probability of relapse among new mothers and to discourage substance use among new fathers and fathers-to-be by screening parents for heavy drinking, cigarette smoking, and marijuana use; by providing information about the effects of parent substance use on children; and by connecting substance-using parents to available treatment resources.

Unfortunately, available data suggest that many health practitioners do not routinely ask parents about their substance use, even though most parents believe that such questions are appropriate (38–40). In fact, most parents who smoke cigarettes may welcome recommendations to stop smoking, referral to telephone quitlines, or the receipt of a prescription for smoking cessation medications from their child's doctor (39,40).

Implications for Practice

The first few months postpartum represent an important opportunity to prevent relapse to substance use among women who desisted during pregnancy and to educate new fathers about the potential effects of their substance-use behavior on their child's development and on the substance-use behavior of their partner. Pediatricians and other health care practitioners should follow published guidelines about screening parents for substance use (1,41) and be familiar with the "Core Competencies for Involvement of Health Care Providers in the Care of Children and Adolescents in Families Affected by Substance Abuse" (42).

Conclusions

Men's substance use was not affected by their partner's pregnancy. Pregnancy did decrease the probability of

substance use among women, but substantial proportions of women cigarette and marijuana users who reported a pregnancy used these substances during pregnancy (77% and 50%, respectively). Many of the women who desisted from substance use while pregnant returned to use after their child was born. These results suggest that additional efforts are needed to reduce substance use during pregnancy and the return to use postpartum among young men and women.

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